FOREST STATISTICS FOR YAKIMA CO., WASHINGTON

FOREST SURVEY REPORT NO. 121

U. S. DEPARTMENT OF AGRICULTURE · FOREST SERVICE
PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION
R. W. COWLIN, DIRECTOR

PORTLAND, OREGON AUGUST 1955

PREPARED BY THE DIVISION OF FOREST ECONOMICS

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Special credit is given to personnel of the regional office, National Forest Administration, Region 6, and the forest supervisor and his staff of the Snoqualmie National Forest, for assistance in conducting the reinventory of national forest lands.

Acknowledgment is also made of cooperation from public and private agencies in furnishing cutting and ownership records.

FOREST STATISTICS

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U. S. Department of Agriculture Forest Service
Pacific Northwest Forest and Range Experiment Station

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FOREWORD

This publication summarizes in statistical form the results of a reinventory of the forests of Yakima County, Washington, conducted in 1954. This reinventory is a part of the maintenance phase of the Forest Survey, a nationwide project of the Forest Service authorized by the McSweeney-McNary Forest Research Act of 1928 and amended June 25, 1949. The purpose of the Forest Survey is to periodically inventory the extent and condition of forest lands and the timber and other products on them, to ascertain rates of forest growth and depletion, to estimate present consumption of timber products and to analyze and make available in reports survey information needed in the formulation of forest policies and programs.

The Forest Survey is conducted in the various forest regions of the Nation by the regional forest experiment stations of the Forest Service. In the Pacific Northwest region of Oregon and Washington it is an activity of the Pacific Northwest Forest and Range Experiment Station at Portland, Oregon.

Under the initial phase of the Forest Survey the forests of Yakima County were inventoried in 1935. A statistical report, "Forest Statistics for Yakima County, Washington" and a detailed forest type map--scale 1 inch to the mile--were released. The reinventory was conducted during the months of May to October 1954. Another result of the reinventory is a revised forest type map of the county, on a scale of either 1 or 2 inches to the mile. 1/

1/ A print of the forest type map is available at cost of blueprinting. For information write Director, Pacific Northwest Forest and Range Experiment Station, P.O. Box 4059, Portland 8, Oregon.

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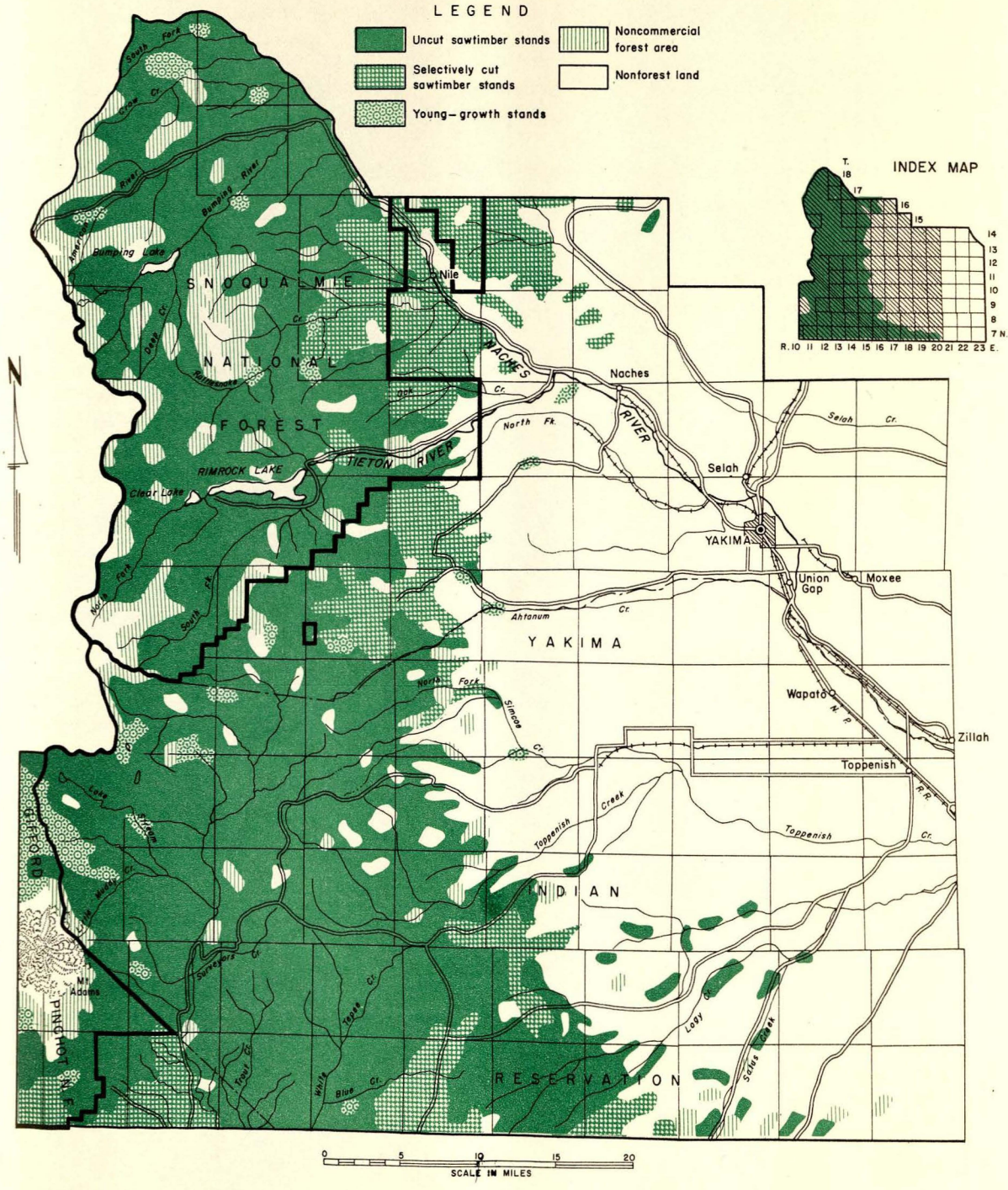
FIGURE 1

FOREST STAND-SIZE AND CONDITION CLASSES

YAKIMA COUNTY, WASHINGTON

1954



SIGNIFICANT FINDINGS IN THE FOREST INVENTORY

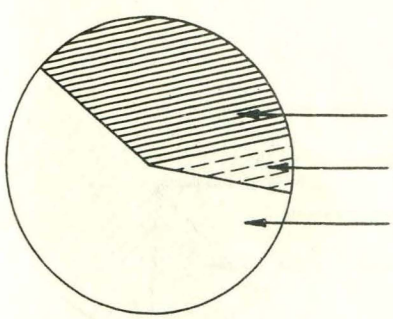
LAND CLASSIFICATION

Yakima County lies in the south-central portion of Washington State. It is the second largest county in the State with a total land area of 2,735 thousand acres. From its western boundary, the summit of the Cascade Range, it extends approximately 80 miles east; from the divide between the Yakima and Naches Rivers it extends southward approximately 75 miles (fig. 1). The central and eastern portions of the county are level or rolling valley lands, while the western portion is characteristically rough mountainous terrain, some of it high and rugged.

Elevations vary from about 500 feet at the Columbia River at the northeast corner of the county to 12,703 feet at the summit of Mt. Adams. Annual precipitation on some of the mountainous western portion may be as high as 60 inches, while in the eastern portion it may be as low as 7 inches. Almost 90 percent of the county is drained by the Yakima River and its tributaries; the remainder is drained by the Klickitat River. Western Yakima County has an abundance of streams, small lakes, and two large artificial lakes--Rimrock and Bumping--which are regulatory in nature for irrigation purposes.

A forest zone occupies the western two-fifths of the county. It forms an almost continuous forest cover from the summit of the Cascade Range on the west to low foothills on the east (fig. 1). Approximately 85 percent of the forest land in this zone was classed in the inventory as commercial forest land. The remaining 15 percent was classed as noncommercial forest land.

The noncommercial forest land area includes 67 thousand acres of productive-reserved land in national forest ownership, 61 thousand acres of subalpine forests, 35 thousand acres of noncommercial rocky sites, and 14 thousand acres of scrub-oak woodland. The acreage of national forest reserved land is included in the Goat Rocks Wild Area, Mount Adams Wild Area, Mather Memorial Parkway, and Cougar Lake Limited Area.



LAND USE

CLASS	THOUSAND ACRES	PERCENT
COMMERCIAL FOREST	970	35.5
NONCOMMERCIAL FOREST	177	6.5
NONFOREST	1,588	58.0
TOTAL	2,735	100.0

These areas, in which the timber has been restricted from commercial utilization, have been set aside for recreational use and as examples of undisturbed natural environment. The subalpine forests, consisting of open, park-like stands of short and limby trees, occupy the upper slopes of Mount Adams and the higher ridges along the summit of the Cascade Range and its lateral spurs. The noncommercial rocky area includes rock slides and steep slopes, within the altitudinal range of merchantable timber, that are covered with a sparse, low-quality, timber growth. The acreage of scrub-oak woodland is found in the central portion of the county where low rainfall limits tree growth.

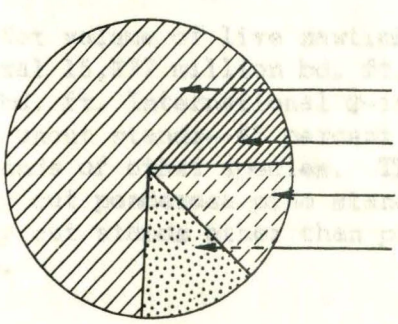
The more than a million and a half acres of nonforest land includes cropland and sagebrush-covered hills in the eastern portion of the county and mountain meadows and barrens in the western portion. According to a Bureau of Census report for 1950 there was a total of 343 thousand acres of cropland, more than three-fourths of which was irrigated with water from the forest zones of Yakima County and adjoining Kittitas County.

Commercial Forest Land by Major Types

Two broad belts of major types cover the county's forest zone. One belt, consisting very largely of ponderosa pine types, spreads across the eastern portion of the zone. This belt varies in width from 10 to 20 miles in the north to 45 miles in the southern portion of the county, where it spans the entire width of the forest zone.

The second belt, covering the rough mountainous terrain of the western portion of the forest zone, consists of an irregular patchwork of various major types. Douglas-fir type predominates on the slopes generally just above the ponderosa pine type. The fir-spruce type, occupying the upper slopes above the Douglas-fir type, consists of a variety of the true firs, mountain hemlock, or Engelmann spruce. Interspersed between the areas of Douglas-fir and fir-spruce are a large number of other types in which the key species is either western larch, western hemlock, lodgepole pine, or western white pine. Stringers of ponderosa pine type also extend into the western belt; these reach westward along most of the main streams and on south- and east-facing slopes.

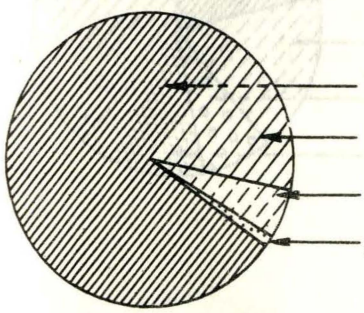
MAJOR FOREST TYPES



TYPE	THOUSAND ACRES	PERCENT
PONDEROSA PINE	592	61.0
DOUGLAS-FIR	117	12.1
FIR-SPRUCE	131	13.5
OTHER	130	13.4
TOTAL	970	100.0

Commercial Forest Land by Stand-Size and Condition Class

Timber utilization, largely on a partial-cut basis, has influenced the character of the forest on about one-sixth of the county's commercial forest acreage. To date, a total of 175 thousand acres has been logged. On 98 percent of this logged area the residual stands are of sufficient volume—1,500 board feet, International ¼-inch rule per acre—to qualify as selectively cut sawtimber. The remainder of the logged land is now stocked with young stands, mostly of pole size. Nearly all of the logging operations to date have been in the ponderosa pine sawtimber type. Seedling and sapling stands have restocked some 9 thousand acres that were depleted by such natural agencies as forest insects, disease, or fire. The nonstocked area totals about 2 thousand acres, all of which was deforested by fires that occurred years ago.



STAND SIZE OR CONDITION

CLASS	THOUSAND ACRES	PERCENT
UNCUT SAWTIMBER	742	76
SELECTIVELY CUT SAWTBR.	171	18
POLETIMBER	46	5
SEEDLING, SAPLING, AND NONSTOCKED	11	1
TOTAL	970	100

Of the 742 thousand acres of uncut sawtimber stands, a total of 426 thousand is stocked with ponderosa pine. On 419 thousand acres of this pine area, the timber is classed as large sawtimber, i.e., the trees are 21 inches d.b.h. and larger; the timber on 7 thousand is classed as small, i.e., the trees are 11 to 20 inches d.b.h. Uncut sawtimber stands other than ponderosa pine cover 216 thousand acres. Half of this acreage is in Douglas-fir type; the other half is divided between the other upper-slope types including the true-fir-mountain hemlock, lodgepole pine, western larch, white fir, western hemlock and western white pine types.

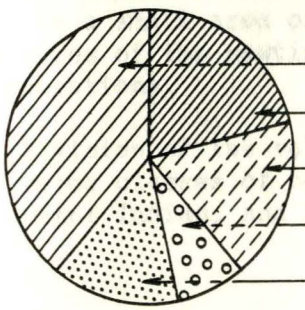
TIMBER VOLUME

Net volume of live sawtimber on commercial forest land is estimated to total 15,277 million bd. ft., log scale, Scribner rule, or 16,633 million bd. ft. International ¼-inch rule. Ninety-one percent of the volume is in uncut stands—45 percent in ponderosa pine stands, and 46 percent in stands of other species. The remaining 9 percent is mostly in selectively cut ponderosa pine stands. There is a small volume each in selectively cut stands other than pine, in immature stands, and on nonstocked areas.

Volume of Sawtimber by Species

Ponderosa pine is the county's most abundant and valuable commercial species. It comprises nearly two-fifths of the volume of all sawtimber stands. Douglas-fir, white fir, and western larch occur in appreciable volumes and have increasing commercial importance. There are three species represented in the true fir volume; they are Pacific silver, white, and subalpine fir. Other species of considerable volume are western white pine, lodgepole pine, mountain and western hemlock, and Engelmann spruce.

SAWTIMBER VOLUME



SPECIES	MILLION BD. FT.	PERCENT
PONDEROSA PINE	5,994	39
DOUGLAS-FIR	3,236	21
TRUE FIRS	2,769	18
WESTERN LARCH	1,157	8
OTHER	2,121	14
TOTAL	15,277	100

FOREST OWNERSHIP

Four major classes of owners divide the commercial forest land and timber volume: private, State, Indian, and Federal national forest.

Ownership of Commercial Forest Land

Private owners collectively hold 116 thousand acres of sawtimber stands, almost half of which has been selectively logged. They also own 7 thousand acres of young immature timber. Some 41 thousand acres of the private land is included in 160-acre tracts scattered through a portion of the area within the Yakima Indian Reservation. These tracts resulted from early homesteads and from allotments of tracts to individual Indians which became fee patented. There is also 13 thousand acres of private land in an alternate-section pattern inside the boundaries of the Snoqualmie and Gifford Pinchot National Forests. This pattern resulted from early railroad land grants.

The commercial forest land owned by the State of Washington lies in the north-central portion of the county. Some of the State acreage is school-grant land in an alternate-section pattern and some is in large continuous tracts as a result of either land exchanges or of recent purchases by the State Game Commission.

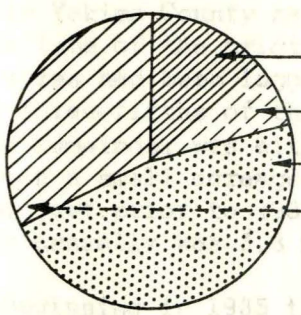
Sawtimber stands are found on 94 percent of the State acreage and poletimber stands stock the remaining 6 percent. More than three-fifths of the sawtimber acreage has been selectively logged.

Indians own nearly half of the commercial forest land in the county. This ownership, all within the Yakima Indian Reservation, includes 430 thousand acres of sawtimber stands of which a total of 41 thousand acres has been selectively logged. Young immature stands cover 24 thousand acres and a nonstocked burn covers 1 thousand acres.

The national forest ownership is divided between two forests: 292 thousand acres in the Snoqualmie and 29 thousand acres in the Gifford Pinchot. Ninety-four percent of this federally owned acreage is stocked with sawtimber and nearly all of the remainder by young immature stands; there is a small area of old burns that is nonstocked. About 40 thousand acres of the sawtimber stands have been covered in selective logging operations.

Division of the valuable ponderosa pine type acreage between the four major classes of owners is: 16 percent private, 7 percent State, 57 percent Indian, and 20 percent national forest.

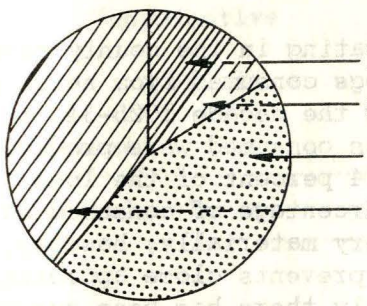
COMMERCIAL FOREST LAND



OWNERSHIP CLASS	THOUSAND ACRES	PERCENT
PRIVATE	123	13
STATE	70	7
INDIAN	455	47
FEDERAL		
NATIONAL FOREST	321)	33
BUREAU OF LAND MGT.	1)	
TOTAL	970	100

Ownership of Sawtimber Volume

The following graph shows division of the estimated sawtimber volume of all species by ownership class. Ownership of the sawtimber volume of the valuable species, ponderosa pine, is quite different: 13 percent in privately owned, 5 percent State, 66 percent Indian, and 16 percent national forest.



OWNERSHIP CLASS	VOLUME MILLION BD. FT.	PERCENT
PRIVATE	1,525	10
STATE	921	6
INDIAN	6,831	45
FEDERAL		
NATIONAL FOREST	5,992)	39
BUREAU OF LAND MGT.	8)	
TOTAL	15,277	100

FOREST UTILIZATION

It has been only in recent years that the volume of timber utilization in Yakima County has become of large-scale proportions. By 1935, at the time of the original Forest Survey inventory, a total of 33 thousand acres had been logged, practically all of it in ponderosa pine type. About three-fifths of this logged acreage was privately owned, and most of the remainder was either in Indian or national forest ownership; there had been a small acreage of State-owned land logged. During the 10-year period just prior to 1935 the average volume of live timber cut in the county annually was 3.3 million board feet, log scale, Scribner rule.

Beginning in 1935 there has been a generally steady increase in the annual volume of timber cut. In the decade 1935-44 average cut was nearly 36 million board feet. During the period 1945-52 the average climbed to 56 million board feet, with a peak cut of 90 million in 1952.

The reinventory in 1954 found a total logged area of 175 thousand acres. Approximately one-third of this acreage is private land and the remaining two-thirds is quite equally divided between State, Indian, and national forest land. Nearly all of the logging to date has been in ponderosa pine type. Classification of the residual stands following logging shows 94 percent of the logged acreage to be of ponderosa pine type and 6 percent of other types.

The volume of lumber manufactured annually in Yakima County during the past three decades has been at a fairly steady rate except in a few years. For the 22-year period 1925-46 inclusive, an average of 67 million board feet of lumber was produced annually. Lowest production for the period was 40 million in 1934 and highest was 85 million in 1941. Records for years since 1946 are not available, but it is probable that production has equaled or exceeded the average for the period 1925-46. Since 1925 the yearly number of active sawmills in the county has varied from 2 to 6. One large sawmill has operated throughout this period and has produced the major portion of the lumber manufactured.

Except in recent years, the sawmills operating in the county have imported a very large part of the volume of logs consumed from neighboring counties, chiefly Kittitas County. During the decade 1925-34, it is estimated that only about 6 percent of the logs consumed were produced in the county. In the decade 1935-44, about 54 percent of the logs were produced locally. In recent years the percentage of consumed log volume that has been imported has decreased very materially; however, lack of exact statistics on lumber production prevents close approximation of the percentage imported. Also, recently there has been considerable export of logs from the county.

Table 1.—Land area by major classes of land, 1954

Class of land	Area
	Acres
Forest:	
Commercial	969,670
Noncommercial:	
Productive reserved	66,790
Unproductive	110,580
Total	1,147,040
Nonforest	1,587,680
Total, all classes	2,734,720

Table 2.—Area of commercial forest land by ownership and stand-size classes, 1954

Ownership class	Total	Saw-timber stands	Pole-timber stands	Seedling and sapling stands	Nonstocked areas
	Acres	Acres	Acres	Acres	Acres
Private	122,890	115,560	7,000	130	200
State	69,720	66,040	3,680		
Federally owned or managed:					
Indian	454,860	429,830	19,730	4,320	980
Bur. of Land Mgt.	680	680			
National forest	321,520	301,100	15,480	4,480	460
Total Federal	777,060	731,610	35,210	8,800	1,440
All ownerships	969,670	913,210	45,890	8,930	1,640

Table 3.—Area of commercial forest land by major forest type and stand-size class, 1954

Forest type	Total	Sawtimber stands		Pole-timber stands	Seedling and sapling stands	Non-stocked areas
		Large 1/	Small 2/			
	Acres	Acres	Acres	Acres	Acres	Acres
Ponderosa pine	592,010	552,580	33,220	5,240	970	
Western white pine	5,980	200	2,600	2,390	790	
Lodgepole pine	56,900		42,850	12,210	1,840	
Douglas-fir	116,730	102,070	12,320	1,840	500	
Larch	55,820	25,250	22,400	8,010	160	
Fir-spruce	130,890	62,650	52,220	11,350	4,670	
Hemlock-Sitka spruce	1,520	680	840			
Hardwoods	8,180		3,330	4,850		
Nonstocked areas	1,640					1,640
Total	969,670	743,430	169,780	45,890	8,930	1,640

1/ 21 inches d.b.h. and larger.

2/ 11 to 21 inches d.b.h.

Table 4.--Land area by cover type, ownership class, and land-use class, 1954

Cover type	Total unreserved and reserved	Unreserved						Reserved	
					Federally owned or managed				Federal
		Total	Private	State	Indian	Bureau of Land Mgt.	National forest	Total	National forest
PRODUCTIVE FOREST LAND									
		Commercial						Noncommercial Productive-reserved	
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Ponderosa pine, large sawtimber	555,200	552,580	76,970	34,980	324,990	680	114,960	2,620	2,620
Ponderosa pine, small sawtimber	33,220	33,220	14,480	8,440	8,980		1,320		
Ponderosa pine, poletimber	5,240	5,240	2,120	680	920		1,520		
Ponderosa pine, seedlings and saplings	970	970	130		520		320		
White pine, large sawtimber	200	200			80		120		
White pine, small sawtimber	2,600	2,600		40	2,000		560		
White pine, poletimber	2,390	2,390	480	400	1,270		240		
White pine, seedlings and saplings	790	790			430		360		
Lodgepole pine, small sawtimber	43,780	42,850	5,270	2,970	25,030		9,580	930	930
Lodgepole pine, poletimber	12,230	12,210	520	210	7,590		3,890	20	20
Lodgepole pine, seedlings and saplings	1,840	1,840			1,050		790		
Douglas-fir, small old-growth and large young-growth sawtimber	115,980	102,070	3,540	5,450	12,070		81,010	13,910	13,910
Douglas-fir, small young-growth sawtimber	12,960	12,320	1,260	550	320		10,190	640	640
Douglas-fir, poletimber	1,960	1,840	80				1,760	120	120
Douglas-fir, seedlings and saplings	1,220	500			440		60	720	720
Western larch, large sawtimber	26,970	25,250	3,830	6,290	5,800		9,330	1,720	1,720
Western larch, small sawtimber	26,590	22,400	3,790	4,060	1,450		13,100	4,190	4,190
Western larch, poletimber	8,570	8,010	670	1,350	930		5,060	560	560
Western larch, seedlings and saplings	160	160			40		120		
White fir, large sawtimber	10,190	10,190	1,050	380	8,680		80		
White fir, small sawtimber	6,950	6,950	1,410	1,280	3,820		440		
True fir-mountain hemlock, large sawtimber	56,870	45,670	200		19,750		25,720	11,200	11,200
True fir-mountain hemlock, small sawtimber	64,470	41,260	2,610	1,200	11,220		26,230	23,210	23,210
True fir-mountain hemlock, poletimber	13,230	11,350	520	600	7,220		3,010	1,880	1,880
True fir-mountain hemlock, seedlings and saplings	5,580	4,670			1,840		2,830	910	910
Hemlock, large sawtimber	680	680					680		
Hemlock, small sawtimber	960	840					840	120	120
Engelmann spruce, large sawtimber	10,750	6,790	350	160	950		5,330	3,960	3,960
Engelmann spruce, small sawtimber	4,010	4,010	20	120	2,260		1,610		
Hardwoods, small sawtimber	3,330	3,330	780	120	2,430				
Hardwoods, poletimber	4,850	4,850	2,610	440	1,800				
Deforested by fire, nonstocked	1,720	1,640	200		980		460	80	80
Total	1,036,460	969,670	122,890	69,720	454,860	680	321,520	66,790	66,790
NONCOMMERCIAL UNPRODUCTIVE FOREST LAND									
Subalpine	61,540	31,260	1,900	760	4,740		23,860	30,280	30,280
Noncommercial rocky	35,080	29,780	2,800	1,170	3,970	30	21,810	5,300	5,300
Oak-madrone	13,960	13,960	200		13,760				
Total	110,580	75,000	4,900	1,930	22,470	30	45,670	35,580	35,580
NONFOREST LAND									
Agriculture, grass and brush, and open--nonvegetative	1,587,680	1,564,830	1,532,940 acres of nonforest land unclassified as to ownership				8,210 23,680	80 22,770	80 22,770
Total	1,587,680	1,564,830	1,532,940				31,890	22,850	22,850
ALL LAND									
Forest land:									
Commercial	969,670	969,670	122,890	69,720	454,860	680	321,520		
Noncommercial (productive-reserved and unproductive)	177,370	75,000	4,900	1,930	22,470	30	45,670	102,370	102,370
Total forest land	1,147,040	1,044,670	127,790	71,650	477,330	710	367,190	102,370	102,370
Nonforest land	1,587,680	1,532,940 acres of nonforest unclassified as to ownership					31,890	22,850	22,850
Total all land 1/	2,734,720	2,210,420					399,080	125,220	125,220

1/ The total area of the county, according to the Bureau of the Census (1950) is 2,734,720 acres. Of this total, 1,201,780 acres was classified in the Forest Survey reinventory; area included all of the forest land in the county plus nonforest land in the national forest ownership.

Table 5.--Area of commercial forest land by forest-condition and ownership classes, 1954

Forest-condition class	Total	Private	State	Federally owned or managed		
				Indian	Bureau of Land Mgt.	National forest
	Acres	Acres	Acres	Acres	Acres	Acres
Conifer large sawtimber						
Uncut	603,340	47,010	19,620	338,220	320	198,170
Selectively cut	140,090	38,930	27,640	34,100	360	39,060
Total	743,430	85,940	47,260	372,320	680	237,230
Conifer small sawtimber						
Uncut	135,880	14,840	9,430	48,940		62,670
Selectively cut	30,570	14,000	9,230	6,140		1,200
Total	166,450	28,840	18,660	55,080		63,870
Conifer poletimber						
On cutovers	3,040	1,840	680	440		80
On other	38,000	2,550	2,560	17,490		15,400
Total	41,040	4,390	3,240	17,930		15,480
Conifer seedlings and saplings						
On cutovers	50	50				
On other	8,880	80		4,320		4,480
Total	8,930	130		4,320		4,480
Hardwoods						
Sawtimber	3,330	780	120	2,430		
Poletimber	4,850	2,610	440	1,800		
Total	8,180	3,390	560	4,230		
Nonstocked Total	1,640	200		980		460
Total	969,670	122,890	69,720	454,860	680	321,520

Table 6.--Area of young-growth timber stands on commercial forest land by density-of-stocking class, species group, and stand-size class, 1954

Stocking class and species group	Total young-growth stands	Sawtimber		Pole-timber	Seedlings and saplings
		Large 1/ young growth	Small 2/ young growth		
	Acres	Acres	Acres	Acres	Acres
Well stocked					
Softwoods	270,530	101,100	140,290	25,600	3,540
Hardwoods	6,380		2,570	3,810	
Total	276,910	101,100	142,860	29,410	3,540
Medium stocking					
Softwoods	44,120	970	25,460	13,560	4,130
Hardwoods	1,760		760	1,000	
Total	45,880	970	26,220	14,560	4,130
Poorly stocked					
Softwoods	3,840		700	1,880	1,260
Hardwoods	40			40	
Total	3,880		700	1,920	1,260
All classes					
Softwoods	318,490	102,070	166,450	41,040	8,930
Hardwoods	8,180		3,330	4,850	
Total	326,670	102,070	169,780	45,890	8,930

1/ Includes only the stands classified and mapped as Douglas-fir large young-growth sawtimber in which trees are 21.0 inches d.b.h. and larger.

2/ Includes stands of all types in which trees are 11.0 to 20.9 inches d.b.h.

Table 7.--Net volume of live sawtimber[1/] and growing stock[2/] on commercial forest land by ownership class, 1954

Ownership class	Sawtimber		Growing stock
	Million board feet, log scale, Scribner rule	Million board feet, International ¼-inch rule	Million cubic feet
Private	1,525	1,665	357
State	921	1,006	218
Federally owned or managed:			
Indian	6,831	7,429	1,516
Bur. of Land Mgt.:			
Public domain	8	9	2
National forest	5,992	6,524	1,481
Total Federal	12,831	13,962	2,999
All ownerships	15,277	16,633	3,574

1/ Includes live trees 11.0 inches diameter breast height and larger measured in board feet.

2/ Includes live trees 5.0 inches diameter breast height and larger measured in cubic feet.

Table 8.--Net volume of live sawtimber and growing stock on commercial forest land by stand-size class, 1954

Stand-size class	Sawtimber		Growing stock
	Million board feet, log scale, Scribner rule	Million board feet, International ¼-inch rule	Million cubic feet
Sawtimber stands:			
Ponderosa pine type			
Uncut	6,793	7,360	1,418
Selectively cut	1,377	1,510	317
Total pine	8,170	8,870	1,735
Other types			
Uncut	6,840	7,470	1,729
Selectively cut	237	259	60
Total other	7,077	7,729	1,789
Total sawtimber	15,247	16,599	3,524
Poletimber stands	30	34	50
Seedling and sapling stands	1/	1/	1/
Nonstocked areas	1/	1/	1/
Total	15,277	16,633	3,574

1/ Less than 500 thousand.

Table 9.--Net volume of live sawtimber and growing stock on commercial forest land by species, 1954

Species	Sawtimber		Growing stock
	Million board feet, log scale, Scribner rule	Million board feet, International ¼-inch rule	Million cubic feet
Softwoods:			
Ponderosa pine	5,994	6,495	1,136
Western white pine	207	223	56
Lodgepole pine	542	633	209
Douglas-fir	3,236	3,516	719
Western larch	1,157	1,274	253
Pacific silver fir	797	861	258
Grand fir	1,773	1,915	465
Subalpine fir	199	215	102
Mountain hemlock	473	511	132
Western hemlock	164	177	46
Engelmann spruce	554	618	133
Western redcedar	91	97	22
Alaska-cedar	68	72	23
Total	15,255	16,607	3,554
Hardwoods:			
Black cottonwood	21	25	19
Oregon white oak	1	1	1
Red alder			1/
Total	22	26	20
All species	15,277	16,633	3,574

1/ Less than 500 thousand.

Table 10.—Net volume of ponderosa pine, Douglas-fir and other live sawtimber species on commercial forest land by diameter class group and log rule, 1954

Diameter class and log rule	Total	Ponderosa pine	Douglas-fir	Other species
	Million bd. ft.	Million bd. ft.	Million bd. ft.	Million bd. ft.
11.0" to 20.9" d.b.h.				
Scribner rule	4,740	1,085	771	2,884
International ¼-inch rule	5,361	1,258	894	3,209
21.0" to 30.9" d.b.h.				
Scribner rule	5,590	2,351	1,016	2,223
International ¼-inch rule	6,044	2,539	1,098	2,407
31.0" to 40.9" d.b.h.				
Scribner rule	3,479	1,865	862	752
International ¼-inch rule	3,697	1,977	914	806
41.0" d.b.h. and larger				
Scribner rule	1,468	693	587	188
International ¼-inch rule	1,531	721	610	200
All diameter classes				
Scribner rule	15,277	5,994	3,236	6,047
International ¼-inch rule	16,633	6,495	3,516	6,622

Table 11.--Net volume of all timber on commercial forest land by class of material and species group, 1954

Class of material	Total	Softwoods	Hardwoods
	Million cubic feet	Million cubic feet	Million cubic feet
Growing stock:			
Sawtimber trees:			
Sawlog portion	2,826	2,820	6
Upper stem portion	212	212	1/
Total	3,038	3,032	6
Poletimber trees	536	522	14
Total growing stock	3,574	3,554	20
Other material:			
Sound cull trees	1/	1/	
Rotten cull trees	8	8	1/
Salvable dead trees	59	59	
Total other material	67	67	1/
Total, all timber	3,641	3,621	20

1/ Less than 500 thousand.

Table 12.--Average annual cut of live sawtimber and growing stock on commercial forest land by species group for the period 1948-52 incl.

Species group	Sawtimber						Growing stock		
	Timber products	Logging residual	Annual cut 1/	Timber products	Logging residual	Annual cut 1/	Timber products	Logging residual	Annual cut 1/
	Thousand board feet, log scale, Scribner rule			Thousand board feet, International $\frac{1}{4}$-inch rule			Thousand cubic feet		
Softwoods	80,866	4,464	85,330	88,039	4,860	92,899	18,918	2,283	21,201
Hardwoods 2/									
Total	80,866	4,464	85,330	88,039	4,860	92,899	18,918	2,283	21,201

1/ Annual cut is the sum of timber products and logging residues.

2/ Hardwood cut insignificant.

FOREST SURVEY PROCEDURE

The procedures used in the reinventory of Yakima County were materially different from the procedures used in the initial inventory. This change in procedures accounts for some significant differences in both the forest-area and timber-volume statistics obtained. Therefore, a brief description of the procedures used in each inventory seems desirable.

Initial Inventory

The initial inventory of the county was conducted in 1935 by what is known as the "compilation method." In this method existing information on forest types, timber cruises, and logging records, and other pertinent data, were collected from private timber owners and various public agencies. These data were checked in the field for reliability, and were adjusted to the then existing specifications and standards on Forest Survey. Forest-type and timber-volume data for areas not covered by reliable existing information were obtained through field reconnaissance.

All land in the county was classified as either forest or nonforest. Forest land was further classified as commercial or noncommercial; the commercial was still further classified by forest type, stand-size or condition class, and in case of young growth, by stocking class. All such types and classes were mapped in place on 1-inch-to-the-mile base maps of each forested township. These township type maps were then superimposed over current ownership-status plats and dot counted to obtain forest-type-area statistics by ownership class. Type delineations on the township maps were traced to a base map of the county to form a county forest type map. The commercial forest land was also classified as to site quality, or forest-productive capacity.

In-place, timber-volume estimates were based on existing cruises collected and adjusted to the Forest Survey standard, on field samples, and on ocular appraisals. Cruises made by commercial cruisers were obtained for most of the privately owned timber and Forest Service cruises were available for a large portion of the national forest lands. Separate volume estimates were computed for each of the commercial tree species and for each ownership class. Methods used in this initial inventory did not permit a statistical computation of accuracy of the estimate.

Reinventory

In the reinventory in 1954 the forest type map of the county was completely revised. This revision was accomplished through interpretation, classification, and field mapping on aerial photos

which covered all of the commercial forest land and all of the noncommercial forest land in the county. In the delineation of types and conditions on aerial photos similar types were examined on the ground to ensure accuracy in interpretation. The presence of roads through the forested area greatly facilitated these examinations. Types, stand-size classes, and stocking classes were similar to those recognized in the initial inventory. However, field mapping on aerial photos resulted in much greater accuracy and detail than was possible in the earlier inventory through ground reconnaissance alone. Type delineations on the aerial photos were transferred to a 2-inch scale county planimetric base map through use of a photo projector. The new type map was then superimposed over a current ownership-status map and a dot count made of forest type areas by ownership class.

Estimates of net volumes of live sawtimber growing stock, sound cull, rotten cull, and salvable-dead material were developed by applying average-per-acre volumes to the appropriate forest-type acreages. The per-acre volumes for stands of sawtimber and poletimber were obtained through a sampling procedure in which the stands were measured on randomly selected plots. Comparable sawtimber and poletimber per-acre volumes contained in scattered trees in the overstory of seedling and sapling stands and on nonstocked areas were based on empirical estimates. In the random selection of samples each individual sawtimber or poletimber plot in the county had an equal chance to be chosen. A sample consisted of a series of three one-fifth-acre circular plots spaced at 6-chain intervals. Intensity of the sampling was designed to produce a total estimate of volume with a specified sampling accuracy. In the Naches-Tieton Working Circle the random samples measured in the Forest Survey reinventory were supplemented by samples taken by the forest supervisor's staff of the Snoqualmie National Forest for use in developing forest-management plans.

ACCURACY OF REINVENTORY DATA

Forest Area

In the reinventory of the county, in-place mapping of the forests and their classification by forest type, stand-size class, or condition class, were on the basis of 100-percent coverage. Thus no error due to sampling was involved. Errors due to techniques or judgment in the field and in office computation of data were possible, but difficult to evaluate. Throughout all phases of the work close supervision and frequent checks assured a high level of accuracy and uniformity of standards.

Timber Volume

The chances are about 19 out of 20 that the board-foot volume of live sawtimber, if measured by a 100-percent cruise, would be within

plus or minus 11 percent of the estimated total of 15,277 million board feet, log scale, Scribner rule. On this basis the actual volume would be somewhere between 13,597 and 16,957 million board feet. On the same basis cubic-foot volume of growing stock from a 100-percent cruise would be within a range of plus or minus 8.4 percent. The volume estimates by species, stand-size class, or other subdivision, have greater sampling errors than the county totals.

= 7.94% per billion cu. ft. at level of 1-standard error

DIFFERENCE IN RESULTS OF INVENTORIES

Some of the differences in forest-type and timber-volume statistics resulting from the 1935 and 1954 inventories are due to actual physical change. Other differences are due to variations in procedures used, in interpretation and classification of forest conditions, and in standards of utilization. Comparison of the statistics is not meaningful except insofar as these differences are taken into account.

Forest Area

Forest-area statistics resulting from the two inventories are shown in the following table:

Inventory	Total forest land	Commercial forest land						Noncommercial forest land
			Sawtimber		Poletimber	Seedlings and saplings	Nonstocked area	
		Total	Uncut	Selectively cut				
	Thousands of acres							
1935	1,172	1,034	864	17	108	36	9	138
1954	1,147	1,036	804	171	48	11	2	111

The difference in the 1935 and 1954 total forest land areas, an apparent decrease of 25 thousand acres during the interval, probably was not due to any physical change in the forest cover. Instead, the variation appears mainly because of the application of modern survey techniques utilizing aerial photographs, as was pointed out in the preceding section on Procedure, application of survey procedures, and in interpretation of definition.

Differences within the commercial forest land area of stand-size and condition class largely reflect real changes, such as those brought about by logging and growth as well as differences brought about by changes in survey procedure and specifications.

Timber Volume

The respective estimates of total sawtimber volume, by species group, obtained in the two inventories are shown in the tabulation below:

Inventory	Live sawtimber volume				
	All species	Ponderosa pine	Douglas-fir	White fir	Other species 1/
	Million board feet, log scale, Scribner rule				
Initial 1935	8,636	4,308	1,234	346	2,748
Reinventory 1954	15,277	5,994	3,236	1,773	4,274

1/ Includes: western white pine, lodgepole pine, western larch, true firs, mountain hemlock, western hemlock, Engelmann spruce, western redcedar, Alaska-cedar, black cottonwood, and Oregon white oak.

The 1935 estimate was based on national forest cruises, and adjusted county, State land exchange, and Indian Service cruises and on ocular appraisals of uncruised stands. The cruises covered the major portion of the sawtimber acreage. The 1954 estimate was based on a sampling procedure as described on page 19 under "Forest Survey Procedure - Reinventory."

A considerable portion of the change in volume may be due to differences in survey techniques and methods used in the two inventories. The exact extent of the differences in volume which is attributable to the two survey techniques used is not measurable and are due to the inherent differences of the two systems used.

A part of the change in volume during the 20 years was probably due to forest growth, i.e., increment in sawtimber trees and the ingrowth of poletimber trees into the sawtimber class. Conversely, the timber inventory was decreased during the interval through cutting operations and the activities of such natural depleting agencies as forest insects, diseases, and wind.

Another cause of the difference in volumes may have been the variation in standards of utilization between inventories, particularly as they apply to the species other than pine. While the respective standards for pine were quite similar, those for Douglas-fir, white fir, and western larch and other mixed species were changed between inventories to take cognizance of the increased degree of industrial use of these species. In 1954 volume tables were used that gave a materially greater volume for a tree of a given size than did the tables used in the 1935 inventory. Other changes included lowering the minimum top diameter of merchantable length of a sawtimber tree, and reduction of the minimum

requirement of net sound volume in a sawtimber tree from 33-1/3 to 25 percent of gross volume.

Because of the basis of the two estimates and the several factors that have tended to influence them, they do not reflect significant trends in the county's timber resource.

DEFINITION OF TERMS USED

Land Area

Total Land Area

Includes dry land and unmeandered water surface.

Forest Land Area

Includes (a) land which is at least 10-percent stocked by trees of any size and capable of producing timber or other wood products, or of exerting an influence on the climate or on the water regime; and (b) land from which the trees described in "(a)" have been removed to less than 10-percent stocking and which has not been developed for other use. Minimum area of forest land recognized in reinventory of the county is 10 acres.

Nonforest Land Area

Land that does not qualify as forest land. Minimum area recognized in the reinventory of the county is 10 acres.

Forest Land Classes

Commercial Forest Land Area

Forest land which is producing, or is physically capable of producing, usable crops of wood, economically available now or prospectively, and not withdrawn from timber utilization.

Noncommercial Forest Land Area

Forest land (a) withdrawn from timber utilization through statute, ordinance, or administrative order but which otherwise qualifies as commercial forest land, and (b) incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Types

Forest Land Types

Forest land is typed on the basis of predominant species as indicated by cubic volume for sawtimber and poletimber stands, and number of trees for seedling and sapling stands, or as a forest condition such as nonstocked cutover, or burned-over land. Where none of the indicated species comprises 50 percent or more of a given stand, the stand is typed on the basis of plurality of cubic volume or number of trees. In classifying forest land by type the minimum area recognized was 40 acres.

Commercial Forest Land

Major forest types. Local forest types are grouped into generalized types. The major forest types in Yakima County are as follows:

Ponderosa pine. Forests in which 50 percent or more of the stand is ponderosa pine.

White pine. Forests in which 50 percent or more of the stand is white pine.

Lodgepole pine. Forests in which 50 percent or more of the stand is lodgepole pine.

Douglas-fir. Forests in which 50 percent or more of the stand is Douglas-fir.

Hemlock-Sitka spruce. Forests in which 50 percent or more of the stand is western hemlock and/or Sitka spruce.

Larch. Forests in which 50 percent or more of the stand is western larch.

Fir-spruce. Forests in which 50 percent or more of the stand is true fir (Abies spp.), or Engelmann spruce, singly or in combination.

Hardwoods. Forests in which 50 percent or more of the stand is aspen, black cottonwood, red alder, or other western hardwood, singly or in combination.

Noncommercial forest land

Productive-reserved. Forest land withdrawn from timber utilization through statute, ordinance, or administrative order, but which otherwise qualifies as commercial forest land.

Major forest types. In Yakima County major forest types (as defined above) on productive-reserved land are as follows: ponderosa pine, Douglas-fir, western larch, fir-spruce, and hemlock-Sitka spruce.

Unproductive forest land. Forest land incapable of yielding usable wood products (usually sawtimber) because of adverse site conditions, or so physically inaccessible as to be unavailable economically in the foreseeable future.

Subalpine type. Forest at the upper limits of tree growth unmerchantable because of the poor form and small size of the trees.

Noncommercial rocky area. Area within the altitudinal range of merchantable timber that is too rocky, too steep, or too sterile to produce trees of merchantable size, density, and quality.

Nonforest Land Types

Agricultural, grass or brush. Cultivated land, stump pasture, and grass or brush areas.

Nonvegetative. Includes barrens, towns and unmeandered water.

Tree Classes

Sawtimber Tree

Tree of commercial species, 11 inches d.b.h. and larger that contains at least one 16-foot coniferous sawlog or one 8-foot hardwood sawlog to a variable top diameter never less than 8 inches inside the

bark. Also, 25 percent or more of the gross board-foot volume must be free from rot or defect.

Poletimber Tree

Softwood or hardwood tree 5.0 to 10.9 inches d.b.h. of commercial species in which 25 percent or more of the gross cubic-foot volume is free from rot and defect.

Seedling and Sapling Tree

Live trees of commercial species less than 5.0 inches d.b.h. and of good form and vigor.

Cull Tree

Live tree of sawtimber or poletimber size that is unmerchantable, now or prospectively, because of defect, rot, or species.

Cull sound tree. Live tree of sawtimber or poletimber size which contains 25 percent or more of sound volume but will not make at least one merchantable log, now or prospectively, because of roughness or poor form.

Rotten cull tree. Live tree of sawtimber or poletimber size in which less than 25 percent of the total volume is sound.

Salvable Dead Tree

Standing dead or down tree which contains 25 percent or more of sound volume and at least one merchantable 16-foot coniferous or 8-foot hardwood log.

Stand-Size Classes

Sawtimber Stand

Stand of sawtimber trees having a minimum net volume of 1,500 board feet per acre, International $\frac{1}{4}$-inch rule.

Large sawtimber stand. Stand in which the majority of the volume is in trees more than 21.0" d.b.h.

Small sawtimber stand. Stand in which the majority of the volume is in trees from 11.0" to 20.9" d.b.h.

Poletimber Stand

Stand failing to meet sawtimber-stand specifications but at least 10-percent stocked with poletimber and larger (5.0 inches d.b.h. and larger) trees at least half the minimum stocking in poletimber trees.

Seedling and Sapling Stand

Stand not qualifying as either sawtimber or poletimber stand but having at least 10-percent stocking of trees of commercial species and with at least half the minimum stocking in seedling and sapling trees.

Uncut Sawtimber Stand

Sawtimber stand that is essentially undisturbed by cutting.

Selectively Cut Sawtimber Stand

Sawtimber stand in which a partial harvest has been made, and in which the residual volume amounts to 1,500 board feet or more per acre.

Stocking

Stocking is the extent to which growing space is effectively utilized by present or potential growing stock trees of commercial species. "Degree of stocking" is synonymous with "percent of growing space occupied" and means the ratio of actual stocking to full stocking for comparable sites and stands. Stocking may be measured in terms of number of trees, volume, basal area, cover canopy, or other criterion, or combination of criteria.

Well-stocked stands. Stands that are 70 percent or more stocked with present or potential growing stock trees.

Medium-stocked stands. Stands that are 40 to 69 percent stocked with present or potential growing stock trees.

Poorly stocked stands. Stands that are 10 to 39 percent stocked with present or potential growing stock trees.

Nonstocked Area. Areas that are 0 to 10 percent stocked with present or potential growing stock trees.

Timber Volume

Live Sawtimber Volume

Net volume in board feet of live sawtimber trees of commercial species.

Scribner rule. The common board-foot rule used in determining log-scale volume of sawtimber in the Pacific Northwest.

International ¼-inch rule. The standard board-foot rule adopted nationally by the Forest Service in the presentation of Forest Survey volume statistics.

Growing Stock

Net volume in cubic feet of live sawtimber trees and live poletimber trees from stump to a minimum 4.0-inch top (of central stem) inside bark.

All-Timber Volume

Net volume in cubic feet of live and salvable dead sawtimber trees and poletimber trees of commercial species, and cull trees of all species from stump to a minimum 4.0-inch top inside bark.

Tree Species

Tree species commonly found in Yakima County include:

Softwoods:
- Ponderosa pine (Pinus ponderosa)
- Western white pine (Pinus monticola)
- Lodgepole pine (Pinus contorta)
- Douglas-fir (Pseudotsuga menziesii)
- Western larch (Larix occidentalis)
- White fir (Abies grandis)
- Pacific silver fir (Abies amabilis)
- Subalpine fir (Abies lasiocarpa)
- Western hemlock (Tsuga heterophylla)
- Mountain hemlock (Tsuga mertensiana)
- Engelmann spruce (Picea engelmannii)
- Western redcedar (Thuja plicata)
- Alaska-cedar (Chamaecyparis nootkatensis)

Hardwoods:
- Quaking aspen (Populus tremuloides)
- Black cottonwood (Populus trichocarpa)
- Oregon white oak (Quercus garryana)
- Red alder (Alnus rubra)

Timber Cut

Annual Cut of Live Sawtimber

The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from live sawtimber. The volume of timber products cut from live sawtimber.

Logging residues from live sawtimber. The net board-foot volume of live sawtimber trees cut or killed by logging on commercial forest land and not converted to timber products.

Annual Cut of Growing Stock

The net cubic-foot volume of live sawtimber and poletimber trees cut or killed by logging on commercial forest land during a specified year.

Timber products from growing stock. The volume of timber products cut from growing stock.

Logging residues from growing stock. The net cubic-foot volume of growing stock cut or killed by logging on commercial forest land and not converted to timber products.